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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,068	09/27/2005	Johan Samuel Van Den Brink	PHNL030287US	4354

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS
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CLEVELAND, OH 44143

EXAMINER	
CWERN, JONATHAN	
ART UNIT	**PAPER NUMBER**
2809	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,068	VAN DEN BRINK, JOHAN SAMUEL	
	Examiner	Art Unit	
	Jonathan G. Cwern	2809	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *9/27/05* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Patrick Cwern AU 2877
04.29.2007

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/27/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to the application filed on 6/22/04.

Currently, claims 1-17 are pending.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 9/27/05 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

3. Claims 2, 5-6, 8-10, and 12-16 are objected to because of the following informalities:

In claim 2, on line 1, the phrase "substantially smaller" is a vague term. It is suggested to more accurately describe the range of values.

In claim 5, in the preliminary amendment, the dependency on all preceding claims was deleted, so that the claim would appear to not be dependent on any of the preceding claims. It would appear that claim 5 should be dependent on claim 1, it is

suggested to correct this. For purposes of examination, examiner will consider claim 5 to be dependent on claim 1.

In claim 8, on lines 6-7; and in claim 11, on line 6, the phrase "substantially higher" is a vague term. It is suggested to more accurately describe the range of values.

In claim 9, on line 6, the word "tensor" is errantly repeated. It is suggested to remove one occurrence of the word "tensor".

In claim 12, on line 7, the phrase "substantially below" is a vague term. It is suggested to more accurately describe the range of values.

In claim 16, on line 6, the phrase "substantially above" is a vague term. It is suggested to more accurately describe the range of values.

4. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Maier et al. (US 2001/0039377, published: 11/8/01).

7. Maier shows the invention as claimed, in the text as:

Pertaining to claims 1, 12, and 17, a method of perfusion imaging comprising: performing a first magnetic resonance data acquisition with gradient encodings for random motion at a first sensitivity value (sample multiple slices at high and low b-factor, the low b-factor would be the first sensitivity value, [0019]), performing a set of at least six second magnetic resonance data acquisitions with gradient encodings for random motion in different directions at second sensitivity values (the high b-factor would be the second sensitivity value, [0019]), determining a perfusion tensor based on the magnetic resonance data acquisitions (determining a diffusion tensor is described in paragraph [0018], in paragraph [0021], Maier mentions that "the small amplitude, fast diffusing component of the bi-exponential function observed in the very low b-factor range may be attributable to perfusing blood", therefore when Maier determines what he calls a "diffusion tensor", he is also determining the "perfusion tensor" at the low b-factor values, Merriam-Webster's Dictionary second definition of perfuse is "2a : to cause to flow or spread : DIFFUSE b : to force a fluid through (an organ or tissue) especially by way of the blood vessels", showing that diffusion can be synonymous with perfusion).

Pertaining to claim 2, the second sensitivity values being below 50 s/mm2 and the first sensitivity value being substantially smaller than the second sensitivity values (a range of sensitivity values is described, from 0 to 1000 s/mm2, [0021]).

Pertaining to claim 3, the first sensitivity value is substantially zero and the second sensitivity values being between five and thirty, preferably ten (a range of sensitivity values is described, from 0 to 1000 s/mm2, [0021]).

Pertaining to claim 4, the magnetic resonance data acquisitions being performed by means of a series of single-shot echo-planar magnetic resonance data acquisitions (this technique is mentioned as being usable, [0058]).

Pertaining to claims 5 and 17, performing a perfusion tensor visualization step (trace images are generated which represent the diffusion tensor, which as described above would the be the perfusion tensor at low b-values, [0018]).

Pertaining to claim 6, directional information derived from the perfusion tensor is visualized (at least three directions sampled to generate trace images, [0018]).

Pertaining to claims 7 and 13, determining of first slope values between each one of the set of magnetic resonance data acquisitions and the first magnetic resonance data acquisition, and determining the perfusion tensor based on the first slope values (the diffusion coefficient is measured by taking multiple acquisitions at different b-values, whose slope will provide the diffusion coefficient, which is used to obtain the diffusion tensor (which at low b-values would be the perfusion tensor), [0014]).

Pertaining to claims 8, 11, 14, and 16, selecting one of the second magnetic resonance data acquisitions having the strongest measured signal decay, performing of a third magnetic resonance data acquisition at a third sensitivity value, performing of a fourth magnetic resonance data acquisition at a fourth sensitivity value, the third sensitivity value being substantially higher than the second sensitivity values, and the fourth sensitivity value being substantially higher than the third sensitivity value (as described earlier there are at least six acquisitions taking place, in paragraph [0021], it is mentioned that the sampling occurs over a range of b-values from 0 to 1000 s/mm2,

so that each sampling in turn can increase the sensitivity value so that the next value will be higher than the previous one), determining of a diffusion coefficient and a fraction value based on the third and the fourth magnetic resonance data acquisitions to provide a diffusion signal component (the diffusion coefficient is calculated as described above in claim 7, and the blood fraction value is known as mentioned in paragraph [0023], "due to the small blood volume fraction"), eliminating of the diffusion signal component from the magnetic resonance data acquisitions to provide a perfusion signal component (perfusion component is similar to the diffusion component obtained at low b-values as described previously), determining of a perfusion tensor from the perfusion signal components (determining the perfusion tensor as described previously).

Pertaining to claims 9 and 15, a set of at least six third magnetic resonance data acquisitions with gradient encodings for random motion in different directions at third sensitivity values is performed, and a set of at least six fourth magnetic resonance data acquisitions with gradient encodings for random motion in different directions at fourth sensitivity values is performed, and the diffusion tensor is determined based on the third and the fourth magnetic resonance data acquisitions to provide a diffusion signal component (as described previously there are at least six acquisitions taking place, in paragraph [0021], it is mentioned that the sampling occurs over a range of b-values from 0 to 1000 s/mm2, so that each sampling for each acquisition in turn can increase the sensitivity value so that the next value will be higher than the previous one).

Pertaining to claim 10, the third sensitivity value being between 100 and 400, and the second sensitivity value being between 600 and 1200 (paragraph [0021] mentions a

range of 0 to 1000 s/mm2, and paragraph [0023] mentions that studies have gone up to 10,000 s/mm2, so that the values 100, 400, 600, and 1200 are covered by that range).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Wollin (US 6452390) teaches a magnetic resonance analyzing flow meter and flow measuring method, of which one aspect discusses measuring and mapping a perfusion vector.

10. Sorensen et al. (US 7020578) teaches a similar method of imaging at low b-values, and obtaining information from the slope of the acquisitions. He also describes coregistering the low b-value images to the perfusion images.

11. Rose et al. (US 2004/0106864) teaches another method of registering perfusion maps to diffusion images at b-values of zero.

12. Basser et al. (US 5539310) discusses diffusion tensors in depth, including diffusion tensor imaging and a similar method of obtaining the tensor (at least six MR acquisitions).

13. Buscema (US 2006/0098876) teaches generating a teaching database comprising identification vectors for pixels or voxels or image sequences obtained when contrast agents are present, whereto a quality or type of perfusion behavior is associated.

14. Yablonsky et al. (US 7078897) teaches a magnetic resonance method and system for quantification of anisotropic diffusion, utilizing diffusion tensors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan G. Cwern whose telephone number is 571-270-1560. The examiner can normally be reached on Monday through Friday 7:30AM - 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JC
4/27/07

Patent Examiner AU 2877
04.29.2007